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MEASUREMENT AND DETERMINANTS OF SOCIOECONOMIC DEVELOPMENT: A CRITICAL CONSPECTUS

ABSTRACT. The study evaluates the progress made in the past decades on the measurement of socioeconomic performance. Both income and social indicators approaches are thoroughly surveyed and an additional contribution is made to the latter by undertaking a large-scale correlation study. The results of the correlation analysis indicate a high level of correspondence between per capita GNP and various composite social indices constructed by an aggregation procedure called the 'Wroclaw Taxonomic Method'. On the determinants of socioeconomic progress, the study examines two well-known development strategies, equity and basic needs. Besides, it suggests few other policy instruments which might influence the level of socioeconomic development. Finally, some 'new' areas are identified for future research in this subject.

INTRODUCTION

In order to evaluate alternative economic strategies, it is necessary to measure development performance of a country or group of countries with similar characteristics. Earlier attempts at the measurement of development generally focused on the growth of per capita GNP and its components. Increasingly, development economists have become aware that growth of output or income by themselves are not adequate indicators of development. The search for a better measure of development proceeded in two different directions. One line of research, which we call 'income approach', has produced a number of studies trying to reformulate GNP through various adjustments so that the modified measures can capture some of the welfare aspects of development and are more comparable across countries and over time. Another approach, popularly known as 'Social indicators approach', is built upon the premise that development is a multidimensional process involving the transformation of the whole social system, and an appropriate measure for such a process should therefore incorporate a wide range of social and economic indicators reflecting the various aspects of the

society. Despite some methodological problems and data constraints, the social indicators research in the past two decades has already generated a number of 'composite' indices of development, obtained by combining a number of monetary as well as non-monetary measures through different aggregation procedures. These new aggregates, tested empirically, are found to be better indicators of the level of living, and thus seem to be the most promising supplement to the per capita GNP measure. Some work has also been done on developing a system somewhat similar to national income accounting for the orderly presentation of social indicators. This paper provides a brief review of all these contributions.

Investigations pertaining to the determinants (i.e. policy instruments) of development have also been carried out from two angles. One approach, often cited as 'equity-oriented approach', places great emphasis on the attainment of distributive justice as a means of accelerating the pace of development. It is argued that improved distribution will help eradicate poverty by raising the welfare of the low-income groups, which will eventually contribute to the country's economic growth process. Although there are some evidences of short-run trade-offs between growth and distribution, in the longer term it is more likely that they will be mutually reinforcing. The implementation of this approach requires the redistribution of income (or consumption) to the poverty groups through the fiscal system or through direct allocation of consumer goods. Such a policy prescription originally came from a World Bank sponsored study called "Redistribution with Growth (RWG)" undertaken in the early seventies, which later sparked off a series of empirical works investigating the relationship between growth, distribution, and poverty. A complete review of these voluminous literature is beyond the scope of this paper. Instead, we will present the essential points made in these studies in course of our discussion on policy instruments.

The main problem with the equity-oriented approach is that, in most cases, it adopts a narrow income criterion for measuring inequality and poverty, which may fail to reveal the actual conditions. Adoption of broader measures such as social indicators would almost certainly convey a more accurate picture, and the attention of economists has now shifted to that direction. The 'basic needs' approach is concerned

with the eradication of absolute poverty by concentrating on peoples' fundamental needs such as food, nutrition, health, education, and shelter. Meeting these needs may be achieved by various combinations of growth, redistribution of assets and income, and restructuring of production. It is the composition of production and its beneficiaries rather than indexes of total production or of income distribution that have become the primary concern. A number of studies have been made on basic needs in recent years and we intend to review them briefly in this survey. In addition, we shall also highlight the possible impact of some important policy changes such as economic and trade liberalisations, technological upgrading, and industrial restructuring on the basic needs fulfillment as well as the level of socioeconomic development. Finally, we would try to identify some new directions for future research.

INCOME APPROACH

Ever since economists became interested in the problems of less developed countries, the principal yardstick for the measurement of development performance has been the broad national aggregate scores such as GNP or GDP. The use of national accounting concepts was stimulated by the Keynesian revolution, which have had a significant influence on economic thought during the fifties and sixties. Despite heavy reliance on GNP and its growth as the principal performance test of development, economists from the very beginning acknowledged the deficiencies of these national income measures. The measurement problems becomes more actue when one attempts to make international comparisons of GNP. The official exchange rates do not reflect the true purchasing power of currencies, as a large portion of the marketed GNP does not enter into world trade. Moreover, trade policies often create distortions in nominal exchange rates, which may not therefore reflect the true value of even the trade portion of GNP.

Several attempts have been made to adjust GNPs by using purchasing power parities so that output or income of each country is measured at some common price level. The 'International Comparisons Project' of the World Bank has made the most significant contribution in this subject. The results of phase II of their work (see Kravis, I.B. *et*

al., 1978a) indicate that the use of purchasing power partities causes incomes of poor countries to increase by 100 to 200 percent in relation to that of U.S.A. A major difficulty in computing purchasing power parities is that detailed price and quantity information on a wide range of commodities is not available for many countries. Kravis *et al.* (1978b) therefore use a short-cut method to predict the real GDPs (i.e. adjusted for differences in purchasing power) of more than 100 countries. Isenman (1980a) uses a variant of this short-cut approach and presents the revised estimates of GDPs, which he claims, are better on theoretical and statistical grounds. Such adjustments however can not eliminate all the problems of international comparisons. For example, because of climatic conditions greater expenditures may be required for clothing and shelter in the more temperate zones of the world in order to survive, while tropical zones require more expenditure on irrigation and flood control. Furthermore, evaluation of non-tradables (particularly various types of services) are difficult and are subject to many conceptual problems.

Per capita GNP as a general measure of development suffers from many other limitations (see McGranahan, D. V. *et al.* 1972 for details). One important criticism against the concept is that since it is a market-based production-oriented concept, it does not measure welfare of a society. Nordhaus and Tobin (1973) attempted to adjust GNP so that it would be a better "Measure of Economic Welfare (MEW)". This approach entails adding an estimated value of leisure and the services of consumer durables to GNP and subtracting an arbitrary amount from GNP for defence expenditures and other 'regrettables' (such as disamenities of urbanisation, pollution, crime, and so on). The final value of MEW of U.S.A. was found to be twice as much as her GNP due to high value imputed to leisure and other non-market activities. This approach to the measurement of development was subject to serious criticisms as most of the imputations were done rather arbitrarily and the exclusion of so-called regrettables from GNP had no strong theoretical basis.

Ahluwalia and Chenery (1974) have suggested that the growth rate of GNP in itself is a misleading indicator of development, since it is heavily weighted by the income shares of the rich. They suggest two adjustments: either the equal weighting of each decile of income

recipients or the introduction of poverty weights which would place more importance on the growth of incomes for the lower 40%. The welfare implications of the poverty-weighted index are stronger than those underlying the equally-weighted index, since it would generate a welfare function based primarily on the lower-income groups. However, such an income-based poverty index may not truly reflect the changes in the living standards of the poor due to inefficiencies in consumption patterns and the lack of availability of essential goods and services.

Hicks and Streeten (1979) have shown how some social indicators can be incorporated into GNP calculations. For example, life expectancy could be allowed for by using expected lifetime earnings instead of annual income per head or, more crudely, the product of average income and life expectancy. The consumption benefits of literacy could be accounted for by imputing the value of services from education as a durable consumer good. Distribution could be incorporated by taking the median or the mode rather than the mean income or by multiplying the mean income by one minus the Gini coefficient. These suggestions, though tentative in nature, show some important directions for future research on GNP adjustments.

SOCIAL INDICATORS APPROACH

The disappointment with per capita GNP as a 'general' measure of development led to what is popularly known as 'social indicators movement'. Although experts such as Horn (1980) claims that social indicators were used to assess cost of living and poverty in England in as early as 1688, the intensive research in this field started only in early 1970s with pioneering contributions made by international agencies (e.g. UNESCO, 1974, 1976; UN, 1975a; UNRISD, 1978, 1979; OECD, 1973, 1977). The term 'social indicators' refers to the various attempts made to measure the development of health, nutrition, housing, income distribution and other aspects of social and cultural development. It may also include 'economic' indicators pertaining to the development of industry, transport, and communications, and other general economic activities. Most of the authors tend to ignore the technical differences between economic and social indicators and suggest the use of both in order to make the results more meaningful.

Some researchers use the term "development indicators" instead of social indicators in order to avoid possible confusion which may arise due to the distinction between social and economic indicators (e.g. McGrahanan, 1972; Hicks and Streeten, 1979; Bunge, 1981; Othick, 1983; Hsaio, F. S. T. *et al.*, 1983). The social indicators research in the past two decades has led to the growth of enormous publications in the subject, and an information search carried out recently by the present author reproduced a listing of 365 items which also includes the publications on 'Quality of Life' measurement. The latter has generally been used to cover important concepts such as peace, happiness, equality of opportunity, and personal satisfaction, all of which present difficult measurement problems.

The objective indicators of social development are also faced with many conceptual and statistical problems (see N. Baster, ed., 1972 for details). The figures are often unreliable and not comparable, particularly because of different definitions used in collecting data. Unlike the national accounts which use the pricing mechanism to combine heterogeneous items, there is no obvious way to combine different social indicators. As a result, problems arise in utilising the available socio-economic information in an integrated fashion, and in drawing general conclusions. The social indicators movement also suffers from a lack of clear purpose. It is not clear whether the search is for an alternative to GNP or for a complementary or supplementary measure.

Despite the aforementioned problems, social indicators have certain advantages over per capita GNP, as pointed out by Hicks and Streeten (1979). First of all, they are concerned with ends as well as means. The output indicators such as life expectancy, literacy rates, and infant mortality rates reflect the achievement of an important development objective (i.e. basic needs fulfillment). Even some input measures such as hospital beds per 10 000 population or enrolment ratios tend to capture certain aspects nearer to the desirable results. Secondly, many social indicators say something about the distribution as well as the average because skewness at the upper end is more limited than it is for per capita income. Finally, while GNP per capita follows an ascending order from the poorest to the richest countries, some social indicators are capable of catching something of the human, social and cultural costs of opulence as well as poverty. They can, in principle, register

some of the shared global problems such as pollution, environmental degradation, cultural dependence, and so on, and reduce the false hierarchical and paternalistic impression that may be created by purely economic indicators. The GNP measure points to 'catching up' and suggests a race. Social indicators can point to common and shared values and problems, to alternative styles of development, and to the opportunities for learning from one another.

Some research has also been done towards the development of an accounting framework for integrating a large variety of social indicators, and providing the basis for a theory linking policies to results in the area of social planning. UN (1975b) proposed such a system for the presentation of social and demographic data which could cover all aspects of social life. Although the Social Accounting Martix (SAM) of Pyatt and Round (1977) does not utilise social indicators in its present form, it shows an important direction for future research in this area.

COMPOSITE INDICES OF DEVELOPMENT

As the social indicators movement proceeded, economists soon realised the need for generating a single number, somewhat similar to per capita GNP, by combining the multiple measures of social and economic development. Such a composite index would certainly allow one to make a parsimonious presentation of the available evidence, and would greatly facilitate the international as well as intertemporal comparisons of development performance. We however believe that a single composite measure of socioeconomic development is not feasible (Zerby and Khan, 1984). It is better to have more than one index for mainly three reasons. The first relates to the nature of the development process which is fundamentally concerned with the accumulation and effective use of human as well as non-human resources, the composition of which is difficult to define and measure. Additionally, the current theories of development are aimed more specifically at the interaction between economic and social progress than at the relationship among one or two particular types of indicators. Several composite indices, if constructed, would therefore help unravel seemingly complex relationships, which encompass the process of development.

The second source of our reservation concerning a single index is more technical in nature. A wide variety of measurement units are used in socioeconomic data: percentages, number per 1 000 population, daily kilo-calories, monetary values, etc. For indexing, it is generally necessary to rescale the indicators into commensurable units (i.e. common 'numeraire'). Several rescaling techniques (e.g. standardizing by subtracting the group mean and dividing by the standard deviation, conversion into natural logarithms etc.) are suggested in literature and the choice of a particular technique (which seems somewhat arbitrary) may substantially influence the results. Development should therefore be measured by constructing as many indices as possible.

Finally, the construction of a meaningful index depends largely on the choice of relevant weights for the indicators contained in the sample. It is necessary to assign an appropriate level of importance to each indicator before aggregating them into a composite index. Unfortunately, the conteporary research in this field failed to provide a unique set of weights for various development indicators (see Khan 1979 Ch. 5 and Zerby and Khan 1979 for details on weighting problems). In absence of such a weighting scheme, it is not possible to construct a single index which would satisfy everybody.

In fact, a number of socioeconomic indices of development have so far been produced by several people. The most notable one is the 'development index' constructed by the United Nations Research Institute for Social Development (UNRISD). The index is based on 18 'core indicators' which include 9 social and 9 economic indicators (see McGranahan et al., 1972 for details). Drewnowski (1974) proposed the construction of two composite indices, one for 'Level of Living' and the other for 'State of Welfare'. The level of living index is based on 27 indicators covering areas such as nutrition, clothing, health, shelter, education, security, and social environment. The State of Welfare index is a combination of 10 suggested indicators reflecting an individual's somatic status, educational status, and social status. The Overseas Development Council (ODC) provides a measurement called the 'Physical Quality of Life Index (PQLI)' which combines three indicators: infant mortality, life expectancy, and literacy (ODC, 1977).

Hicks and Streeten (1979) indentified six areas of basic needs for indexing purposes, but later suggested that one particular indicator, life

expectancy, could be used as a single measure of basic needs develop-
ment. The authors argue that it is a kind of weighted 'composite' of
progress in meeting basic needs. J. Silber (1983) proposed another
variation of this measure, which he called 'The Equivalent Length of
Life (ELL)'. The computational procedure starts with the assumption
that people derive utility from the number of years lived and that there
exists an additively separable and symmetric social welfare function of
individual lengths of life. ELL is then estimated from such a welfare
function by applying the properties of well-known inequality measures
(e.g. Atkinson's income inequality index and the related concept of
'equality distributed equivalent level of income') to data on duration of
life (i.e. Life Table). The new index was computed for 19 countries and
the results were found to be highly correlated with similar computations
based on other development indicators such as life expectancy, PQLI,
literacy rate and per capita GDP.

Several multivariate techniques have been applied for indexing
socioeconomic development. Ram (1982b) suggested the use of Princi-
pal Component Analysis as a dimension-reducing technique to obtain
one or more composite indices which capture a large proportion of
variance displayed by a larger set of economic and social variables. A
close variant of this method, Factor Analysis, has been applied rather
extensively for similar purpose (e.g. Adelman and Morris, 1967). Other
multivariate methods such as Discriminant Analysis, Canonical Corre-
lation, and Multidimensional Scaling techniques have also been used by
researchers for aggregating the social and economic data. Many
development experts such as McGranahan (1972) tend to oppose the
application of dimension-reducing techniques in development analysis.
McGranahan points to the fact that development involves many
variables that correlate with one another (in linear as well as non-linear
fashions) but no one variable can be treated as functionally 'dependent'
or 'independent'. In a recent UNRISD publication (see McGranahan,
1985), the author proposed a new technique, Best-fitting Median Line
(BFL), which he argues is very flexible because it does not distinguish
between dependent and independent variables and can deal with curvi-
linearity, thus making the maximum use of all available information.

In a recent survey (Zerby and Khan, 1984), we tested several multi-
variate procedures with socioeconomic data from 20 Asian countries.

We found that a relatively new data-analytic technique called 'Wroclaw Taxonomic Method', which was first applied to development studies by Harbison *et al.* (1970) is better than other traditional methods such as Principal Component Analysis or Discriminant Analysis. The method uses Euclidean distances, rather than covariances, and no matrix inversion is required. Additionally, the problem of incorrect signs is eliminated by specifying positive and negative indicators before the computations begin. The use of taxonomic distances also avoids the difficulties associated with singularity in the matrix of covariances or correlations when the number of variables is equal to or greater than the number of observations. We also observed that the choice of indicators is more important than the choice of methods, as similar results can often be obtained by two different techniques. The problem of weighting, which we investigated earlier (Zerby and Khan, 1979), is minimized when the number of indicators is increased significantly. We have proved that weights tend to 'even out' as the number of indicators increases (i.e. weights are spread over a larger sample), and such a finding received strong support from several other researchers (e.g. see McGranahan *et al.*, 1972, 1985). The choice of weights could however be crucial to an index such as PQLI which is based on only three indicators with equal weight attached to each indicator.

We, therefore, suggest that the studies aimed at the construction of aggregate indices should try to include as many indicators as possible in order to minimize the sensitivity of the results to small changes in the values of individual indicator or to slight alterations in the pattern of weights. The present author, for example, used as many as 132 socioeconomic indicators for constructing 6 social and 6 economic indices by utilising the various subsets of indicators (see Khan, 1986). The results proved to be satisfactory in terms of stability, judged primarily on the basis of clustering and ranking results using separate sets of data.

RESULTS OF CORRELATION ANALYSIS

Many studies have indicated a high degree of association between economic indicators such as per capita GNP and social indicators. Three measures of association are usually applied. The most frequently

used one is called the 'simple correlation coefficient' (or Product-moment correlation coefficient) and is designated by 'r'. It measures the strength of linear relationship between the two variables X and Y and its value ranges between -1 and $+1$. When r is between 0 and 1, there exists a positive correlation between the two variables implying that they tend to move in the same direction. The higher the value of r the stronger is the closeness between the two variables. On the otherhand, when r is between -1 and 0, there exists a negative correlation between X and Y, which means that the two variables are inversely related. Another way of measuring the strength of linear relationship is to compute 'r^2' termed 'coefficient of determination' as it represents the variance that X and Y have in common. It ranges from 0 to 1 and a higher value implies a stronger relationship. The third measure, known as 'Spearman's rank correlation coefficient' (r_s), is much simpler to compute and is applied when numerical measurements are difficult to obtain. This nonparametric method requires only the sample observations in rank orders and the value of 'r_s' ranges between -1 and $+1$. The results of all correlation measures can be tested by statistical tests of significance.

McGranahan et al. (1972), for example, observed that the general socioeconomic index which they constructed, was highly correlated with per capita GNP ($r^2 = 0.89$), although there were some countries whose ranking was substantially different under the index. In general, the correlation of the index and GNP per capita was somewhat lower for developing than developed countries. Larson and Wilford (1979) reported that the simple correlation coefficient between PQLI and GNP per capita was about 50 percent when applied to the data for 150 countries, and the coefficient was found to be statistically significant. The Spearman's rank correlation coefficient based on the same data was 0.7664, and was also highly significant. Morawetz (1977) however found that there was a weak correlation between the level of GNP and the indicators of basic needs fulfilment, and even less correlation between the growth of GNP and improvements in basic needs indicators. Hicks and Streeten (1979) computed the correlation coefficients between per capita GNP and a few social and economic indicators, using the World Bank's data for 1970 applied over a large number of countries. The results for 7 social indicators show a modest correlation

with GNP (average $r^2 = 0.50$), while a sample of 5 economic indicators show somewhat higher correlation ($r^2 = 0.71$). When the social indicator data are disaggregated into samples of developing and developed countries, the correlation coefficients for both groups are found to drop drastically ($r^2 = 0.25$ for developing countries, 0.18 for the developed ones). Similar declines in correlation are reported for disaggregated economic indicators.

We constructed six composite social indices by combining various subsets of social indicators (Khan 1986; Khan and Zerby 1985) taken over a sample of 126 countries. The Wroclaw taxonomic method was used for aggregation. The resulting indices represent distances from the "ideal" country (i.e. the country having the 'best' values for all indicators) and their values usually range between 0 (the most developed or ideal country) and 1 (the least developed country). The closer the value of an index to zero, the more developed is the country, and closer to 1, the less developed the country is.

The Wroclaw indices were then correlated with per capita GNP and the analysis was carried out for two time periods, 1970 and 1980. The results are presented in Table I. The correlations between per capita GNP and the aggregate social indices were all found to be quite high

TABLE I
Correlations between GNP per capita and other social indices, 1970 and 1980 (for 126 countries)

Year	Index	Nutrition	Education	Health	Sanitation	Housing	Culture
	(Product-moment correlation coefficients)						
1970		−0.67	−0.80	−0.74	−0.56	−0.79	−0.87
1980		−0.56	−0.66	−0.66	−0.38	−0.70	−0.75
	(Spearman's Rank correlation coefficients)						
1970		−0.77	−0.84	−0.87	−0.60	−0.68	−0.92
1980		−0.76	−0.85	−0.85	−0.58	−0.73	−0.88

Note: The values are significant at 95% level. Only the absolute values are relevant for understanding the strength of relationship between per capita GNP and six social indices. The negative signs appear everywhere simply because the social measures (obtained by the Wroclaw method) are the distances from the "ideal" (or most developed) country. The smaller the distance of a country from the ideal, the better it is from the point of development performance. There will always be a negative correlation between a development indicator such as per capita GNP and a Wroclaw index.

and the rank correlation coefficients were observed to be higher than Product-moment coefficients. Over the decade, the product-moment correlation coefficients seem to have declined quite substantially, though the rank correlation coefficients remained virtually stable.

The correlation results depend on a number of factors such as selection of indicators, method of indexing, sources of data, and country samples. One important explanation why many researchers observed low correlation between per capita GNP and social indicators is that the relationship between the two may often be distinctly non-linear, which cannot be captured by correlation analysis. Indicators such as life expectancy, literacy, and school enrolment have asymptotic limits which reflect physical and biological maxima. For example, it is impossible to have more than 100 percent literacy. Moreover, these limits are often reached by middle-income countries, so that further increases in income show very little improvement in social indicators. High correlations between per capita GNP and social indicators do not imply that the former is a perfect predictor of the latter. Most of the investigators cautioned against the causal interpretation of the relationship between the two.

EQUITY APPROACH

Earlier emphasis on GNP and its growth was based on an assumption that economic growth would automatically 'trickle down' to the poor, and thus would ensure a fairly equitable distribution in the society. Unfortunately, the practical experience of the past twenty-five years or so does not support the validity of such an assumption. Although a large number of Third World countries did achieve the target growth rates during 1950—75, the living standards of the masses of population remained virtually unchanged and the rich-poor gap further widened (see Morawetz, 1977 and Chenery and Syrquin, 1975 for some empirical records). A clamour was then raised by an increasing number of economists and policy makers for the 'dethronement of GNP' and for making more direct attacks on the problems of poverty and income inequality (e.g. Seers, 1972).

There has, in recent years, been a spate of studies on income inequality, poverty and economic growth (e.g. Adelman and Morris,

1973; Ahluwalia, 1976; G. S. Fields, 1980; Kakwani, 1980). Although these studies have produced a wide class of inequality and poverty measures, there is not yet a refined theory which explains their determinants as well as interrelationships. It is however believed that improved distribution will help eradicate poverty by raising the welfare of low-income people. The relationship between income distribution and economic growth has also been thoroughly researched, and the empirical evidence tends to suggest a 'trade-off' between the two in the short run. Most of the economists however believe that the trade-off is fairly weak in nature and is rather non-existent in the longer term. It is argued that distribution and growth will eventually reinforce each other as development proceeds.

Several policies have been suggested for improving the distribution pattern in a country. The most well-known strategy, called 'redistribution with growth' (Chenery et al. 1974), suggests the redistribution of income to the poverty groups through the fiscal system or through direct allocation of consumer goods. While the idea of redistribution sounds attractive theoretically, the implementation of such an approach yields only modest results. Particularly, the absolutely poor people (e.g. landless labourers, sick and disabled persons etc.) hardly benefited as the scheme is aimed to help only the low-income earners through various institutional measures. The alleviation of absolute poverty requires a more direct intervention by the government so as to provide the poor with all basic necessities of life.

A general limitation of the equity approach is that it invariably applies a predominantly income criterion for the estimation of inequality and poverty. While such a measure may have all desirable statistical propoerties, it may fail to reveal the actual conditions prevailing in a country or group of countries. The adoption of a broader measure based on a wide range of social indicators is likely to give a more accurate picture. For example, Ram (1982a) observed in a recent study that, during the past two decades, cross-country income inequality and inequality in the fulfillment of basic needs have changed significantly but in opposite directions, the former increasing while the latter declined. We tested Ram's hypothesis with socioeconomic data for various regions of Indonesia, and found that it truly explained the nature of regional imbalance in the country during 1970—80 (Islam

and Khan, 1988). Following such examples, greater emphasis is now being placed on the use of social and basic needs indicators for monitoring the progress in the attainment of distributive justice in the society.

BASIC NEEDS APPROACH

This approach is concerned with the eradication of absolute poverty by meeting peoples' basic needs such as food, clothing, shelter, health and education. Satisfying these needs may require various combinations of growth, redistribution of asserts, and restructuring of production. The main focus, in this approach, is on the composition of production and its beneficiaries rather than indexes of total output or income. The literature of basic needs is fairly extensive. Most notable is Paul Streeten *et al.* (1981), which contains a near-exhaustive list of references in the subject. Other important studies pertaining to the measurement and implementation of basic needs strategy includes ILO (1977), Streeten and Burki (1978), and Hicks and Streeten (1979). Several authors evaluate the performance of individual countries in providing basic needs (e.g. Isenman, 1980b examines the performance of Sri Lanka), and Streeten (1980) hopes that the basic needs of the world's poor can be met by the year 2000 if there is a strong political commitment to do so.

In search of the determinants of basic need fulfillment, economists have recently studied the interactions among basic needs indicators, growth and income distribution. Hicks (1979) addressed the question of possible trade-off between growth and basic needs, raised earlier by the critics, and found that the countries which had done well on basic needs in 1960 had above average growth rates during 1960—73. Improvement in basic need attainment during the period was also found to be correlated with higher growth rates of GNP, but the author said that it was impossible to ascertain if this improvement was a cause or an effect of the higher growth in output. Goldstein (1985) concludes after a thorough search that the basic needs in developing countries follows a non-linear curve relative to per capita income, asymptotically approaching a limiting level. Within such a relationship, some countries are found to be more 'efficient' than others in improving basic needs at

lower per capita income levels, and the determinants of efficiency include export structure, internal distribution and access to education.

In another important study on this subject, Leipziger and Lewis (1980) observed that (1) in low-income LDCs, income level is more important than distribution for improving basic needs performance, and (2) distribution seems relatively more important in middle-income LDCs. Ram (1985) addressed the same issue, and by analysing the latest available World Bank data on seven basic needs indicators, one income inequality measure, and real GDP per capita within a multiple regression framework, he concludes that, for most basic needs indicators, income seems important in both low-income and middle-income LDCs but the importance of distribution appears quite limited.

Research on basic needs has not yet been able to identify the factors responsible for the fulfillment of such needs. A few countries (e.g. Sri Lanka, People's Republic of China) have succeeded in meeting basic needs at low incomes, and it is necessary to investigate if their experiences can be adapted and applied elsewhere. Most of the studies undertaken so far seem to be preoccupied with the relationship between basic needs, income and distribution. While such a relationship is important at an aggregate level, the policy recommendations would greatly depend on how basic needs attainment in a country or group of countries is related to the development of some other sectors of the economy such as agriculture, industry or transport and communications. We recently made such an attempt and found that agricultural progress is more directly related to basic needs fulfillment for the advanced countries than for the least developed countries (see Khan and Zerby, 1987). Further research is needed on how various policy changes pertaining to agricultural development and industrialisation can influence the attainment of basic needs objectives.

SOME OTHER POLICY ISSUES

Besides policies promoting equity and basic needs fulfillment, various other policy instruments can also encourage socioeconomic development. Trade policy, for instance, can significantly influence the levels of living. While most of the classical and neo-classical economists emphasized that trade is an "engine of growth", some researchers (e.g. Kravis,

1970) contend that trade is the "handmaiden of growth" implying that trade may be helpful but does not necessarily have a dominating influence on economic growth. The empirical evidence however shows that countries that adopted or moved toward an export-promoting strategy (EP) did much better in growth of per capita income and equity than those with an import-substituting (IS) strategy (see Lal and Rajapatirana, 1987 for some statistical records). In a recent contribution, Bhagwati (1986) re-examined the two strategies and argued that EP is still better than IS despite strong criticisms against it on grounds of protectionism and wage-labour market distortions. To illustrate the successful application of EP, all these studies highlighted the experiences of four Asian NIEs, namely, South Korea, Taiwan, Hong Kong, and Singapore. This 'Gang of Four' has also shown impressive performance in basic needs attainment.

Socioeconomic development may also be influenced by the nature of government intervention. This particular point was made by Sen (1981) in an insightful contribution, where the author examined the nature of public policies pursued by the countries who performed relatively better in terms of social indicators such as life expectancy and literary during sixties and seventies. From among the non-communist countries, the four Asian NIEs and Sri Lanka showed impressive performance in social areas, and in all these countries, government played an 'active' role by implementing 'calculated and determined public policy'. The nature of government intervention in these countries was somewhat different. In the Asian foursome, the governments exerted calculated influence through public investment programs, selective control of exports and imports, and the regulatory mechanisms in banking and finance. On the other hand, in Sri Lanka, the government influence was exerted through various social welfare programs and public distribution systems. Sahn (1987) reports that Sri Lanka's recent drive (beginning in 1977) towards a more market-oriented, outward-looking, liberal economic policy has had deleterious consequences for the poor. Rapid inflation which resulted in a decline of real wages, coupled with dramatic decreases in the value of the food stamp scheme, brought about a decline in calorie consumption for lower expenditure groups. In addition, levels of malnutrition increased after the policy change. Rapid population growth, though not clearly indicated in the study, might

have also contributed to the declining living standards, particularly in the rural areas of the country. The process of economic liberalisation involves a lot of complexities, and the outcomes of such policies depend on how the various deregulatory programs are designed and implemented. Further research is needed to study the effects of economic and financial liberalisations on a country's living standard.

Economists have recognised the importance of technological change for increases in productivity and growth from the earlier days. There is an extensive literature on the choice of technology, diffusion of technology in agriculture and industry, and the transfer of technology through Multinational Corporations (e.g. Mansfield, 1968; Salter, 1960; Stewart and James, 1982; Ruttan, 1982; Lall, 1978). Unfortunately, very few attempts have been made to study the contribution of science and technology to a country's socioeconomic development. Bhalla and Fluitman (1985) contend that such a gap in research has been caused mainly by the lack of well-defined indicators for measuring the scientific and technological development. Teitel (1987) used the two currently available indicators, stock of scienctists and engineers, and expenditures in research and experimental development, and regressed them on population size and per capita income. Data published by UNESCO on a wide range of countries were used in the analysis, and the results were statistically significant.

We recently constructed five aggregate indices of technological progress, and attempted to study their relationships with various indices of social development such as housing and infrastructure, health, nutrition, and culture (Khan and Zerby, 1988). Data on 126 countries for two time periods, 1970 and 1980, were used in the analysis. The correlation analysis undertaken for various groups of countries suggests that, for the least developed countries, technological progress does not contribute substantially (i.e. weak correlation between technical and social development indices) to the attainment of social development. In particular, the most broadly defined index of technological progress (defined by seven indicators related to scientific and technical knowledge) showed little correlation with most of the social indicators for this group. As a consequence, it can be conjectured that modernisation and industrial development with the help of imported technology may not be adequate for the fulfillment of basic needs in the relatively poorer

countries. A number of other economists have in fact put forward such
an argument and suggested that these countries should adopt labour-
intensive indigenous technology (known as 'appropriate technology' in
the literature) for improving their levels of living.

Several other studies observed that, in recent years, income ine-
qualities in some of the East Asian NIEs have increased, due mainly to
their drive towards high-technology industries, a process popularly
known as "industrial restructuring". Islam and Kirkpatrick (1986), for
example, show that income inequality in Singapore worsened between
1979 and 1983, and the authors attribute this to the government's
strategy of economic restructuring undertaken during this period.
Several researchers report that inequality in South Korea worsened
during 1970s due to her drive towards heavy and chemical industries
(e.g. see Dornbusch and Park, 1987; World Bank, 1987). The process
of industrial restructuring involves the reallocation of resources within
and between industries, and the outcomes of such policy changes
depend on a number of factors. Further research is required to deter-
mine its effects on socioeconomic development.

FUTURE RESEARCH

The survey, carried out in this paper, has revealed several issues for
future research. These are:

(1) Incorporating social indicators in GNP accounting in line with
    the framework provided by Hicks and Streeten (1979);
(2) Extensions of Social Accounting Systems for integrating a large
    variety of social variables. More work is needed in line with the
    Social Accounting Matrix (SAM) in order to make use of social
    indicators in development planning;
(3) Measuring global inequality and poverty by using composite
    social indices;
(4) Application of social indicators for studying regional imbalances;
(5) Factors influencing the fulfillment of basic needs. Investigations
    are needed to see how the attainment of such needs is related to
    the development of other sectors of the economy (such as

agriculture, industry, infrastructure, and so on) and to certain
policy changes at the national or international levels;

(6) Trade regimes and socioeconomic development. Does an out-
    ward-looking strategy help improve living standards? Is an
    inward-looking strategy inimical to social development? These
    questions can be answered by comparing the levels of living in
    various groups of countries classified by trade-orientation (e.g.
    see the classification made by World Bank in *World Develop-
    ment Report 1987*, p. 83).

(7) Economic liberalisation vs living standards. Interesting studies
    can be made with the recent experience of Southern Cone
    economies (see Corbo and Melo, 1987). The findings will help
    the countries who are presently contemplating liberalization.

(8) Constructing science and technology indicators and measuring
    their impact on various social indices of development. Research
    should be carried out on how technological upgrading (i.e.
    industrial restructuring) affects inequality, poverty, unemploy-
    ment and other social areas in the NIEs.

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